

WHAT IS CLAIMED IS:

1. A vehicular traveling control apparatus,
comprising:

5 a vehicular forward substance detecting
section that detects a forward substance located in a
forward direction of the vehicle:

a vehicular travel controlling section that
performs a vehicular travel control on the basis of a
10 relative positional relationship between the forward
substance detected by the vehicular forward substance
detecting section and the vehicle;

an impulse detecting section that detects such
an impulse that a detection range of the vehicular
15 forward substance detecting section is varied has
been applied to the vehicular forward detecting
section; and

a traveling control inhibiting section that
inhibits the vehicular traveling control by means of
20 the vehicular travel controlling section when the
impulse detecting section detects that the impulse
has been applied to the vehicular forward substance
detecting section.

25 2. A vehicular traveling control apparatus as
claimed in claim 1, further comprising a detection
range variation informing section that informs a
vehicular occupant of the variation in the detection
range of the vehicular forward substance detecting
30 section when the impulse detecting section detects
the impulse has occurred.

3. A vehicular traveling control apparatus as claimed in claim 1, further comprising: a variation rate estimating section that estimates a variation rate of the detection range of the vehicular forward
5 substance detecting section when the impulse detecting section detects that the impulse has been applied to the forward substance detecting section; and a vehicular traveling control modifying section that modifies a control method of the vehicular
10 travel controlling section in accordance with the variation rate estimated by the variation rate estimating section.

4. A vehicular traveling control apparatus as
15 claimed in claim 1, further comprising an acceleration detecting section that detects a vehicular acceleration of the vehicle and wherein the impulse detecting section detects the impulse using the vehicular acceleration detected by means of
20 the acceleration detecting section.

5. A vehicular traveling control apparatus as claimed in claim 1, further comprising a yaw rate detecting section that detects a yaw rate developed
25 on the vehicle and wherein the impulse detecting section detects the impulse using the yaw rate detected by the yaw rate detecting section.

6. A vehicular traveling control apparatus as
30 claimed in claim 1, further comprising a vehicle speed detecting section that detects a vehicular velocity of the vehicle and wherein the impulse detecting section detects the impulse using a

variation rate of the vehicular velocity of the vehicle detected by the vehicle speed detecting section.

5 7. A vehicular traveling control apparatus as
claimed in claim 1, wherein the impulse detecting
section detects the impulse on the basis of the
relative positional relationship between the forward
substance detected by the vehicular forward substance
10 detecting section and the vehicle.

8. A vehicular traveling control apparatus as
claimed in claim 1, further comprising a collision
avoidance determining section that determines whether
15 it is possible to avoid a collision of the vehicle
against the forward substance by means of a vehicular
brake system and it is possible to avoid the
collision of the vehicle against the forward
substance by means of a driver's vehicular steering
20 on the basis of the relative positional relationship
to the forward substance detected by the vehicular
forward substance determining section, a braking
characteristic of the vehicle, and a steering
characteristic thereof and wherein the impulse
25 detecting section detects the impulse when a result
of a determination by means of the collision
avoidance determining section indicates that it is
not possible to avoid the collision of the vehicle
against the forward substance through the vehicular
30 brake system nor the driver's vehicular steering.

9. A vehicular traveling control apparatus as
claimed in claim 3, wherein the vehicular traveling

control modifying section performs the vehicular traveling control only for a smaller relative positional relationship to the forward substance as the variation rate of the detection range estimated
5 by the variation rate estimating section becomes large and also performs the vehicular travel control for a large relative positional relationship to the vehicular forward substance as the variation rate becomes small, as compared with the large variation
10 rate.

10. A vehicular traveling control apparatus as claimed in claim 1, wherein the impulse detecting section comprises: an impulse occurrence determining
15 section that determines whether such the impulse that the detection range of the vehicular forward substance detecting section is varied has occurred on the basis of whether a magnitude of an absolute value of an acceleration signal from a vehicular
20 acceleration sensor is in excess of a predetermined display threshold value ($\Delta\theta_{SET}$); an optical axis deviation quantity estimating section that estimates an optical axis deviation quantity ($\Delta\theta$) of the vehicular forward substance detecting section with
25 respect to the forward direction of the vehicle when the magnitude of a vehicular deceleration detected by the acceleration sensor is in excess of the predetermined display threshold value ($\Delta\theta_{SET}$); and an optical axis deviation display unit that displays a
30 state of the optical axis deviation when the optical axis deviation quantity ($\Delta\theta$) is equal to or smaller than the predetermined display threshold value ($\Delta\theta_{SET}$).

11. A vehicular traveling control apparatus as
claimed in claim 10, wherein the impulse detecting
section further comprises: a first optical axis
deviation quantity determining section that
5 determines whether the optical axis deviation
quantity ($\Delta\theta$) is equal to or larger than a first
predetermined value ($\Delta\theta_{TH2}$); a brake control operation
distance setting section that sets a brake control
operation distance (d_{SET}) in accordance with the
10 optical axis deviation quantity ($\Delta\theta$) when the optical
axis deviation quantity determining section
determines that the optical axis deviation quantity
($\Delta\theta$) when the optical axis deviation quantity
determining section determines that the optical axis
15 deviation quantity ($\Delta\theta$) is equal to or smaller than
the first predetermined value ($\Delta\theta_{TH2}$); and a second
optical axis deviation quantity determining section
that determines whether the optical axis deviation
quantity ($\Delta\theta$) is larger than a second predetermined
20 value ($\Delta\theta_{TH1}$) when optical axis deviation quantity
($\Delta\theta$) is equal to or smaller than the first
predetermined value ($\Delta\theta_{TH2}$).

12. A vehicular traveling control apparatus as
25 claimed in claim 11, wherein, when the first optical
axis deviation quantity determining section
determines that the optical axis deviation quantity
($\Delta\theta$) is larger than the first predetermined value
($\Delta\theta_{TH2}$), a brake control inhibit flag F_{CA} is set to a
30 logical " 1 " representing the brake control inhibit.

13. A vehicular traveling control apparatus as claimed in claim 12, wherein the vehicular traveling control inhibit section comprises a vehicular traveling control inhibit confirming section that
5 confirms whether the brake control inhibit flag (F_{CA}) is set to a logical " 1 " and the brake of a vehicular brake system is not operated and the vehicular traveling control inhibit section inhibits the traveling control when the vehicular traveling
10 control inhibit confirming section confirms that the brake control inhibit flag (F_{CA}) is set to a logical " 1 " and the brake system of the vehicle is not operated.

15 14. A vehicular traveling control apparatus as claimed in claim 13, further comprising a relative positional relationship determining section that determines whether the brake control inhibit flag (F_{CA}) is reset to a logical " 0 " and a relative
20 distance (d_r) between the vehicle and the forward substance detected by the vehicular forward distance detecting section is larger than a brake control operation distance (d_{SET}) when the vehicular traveling control inhibit confirming section confirms that the
25 vehicular traveling control inhibit flag (F_{CA}) is reset to the logical " 0 " and the brake system of the vehicle is operated.

15. A vehicular traveling control apparatus as
30 claimed in claim 14, wherein an automatic braking is inhibited when the relative positional relationship determining section determines that the brake control inhibit flag (F_{CA}) is reset to a logical " 0 " and

the relative distance (d_r) between the vehicle and the forward substance is larger than the brake control operation distance (d_{SET}) .

5 16. A vehicular traveling control apparatus as claimed in claim 15, further comprising a first collision avoidance enabling determining section that determines whether a collision avoidance against the forward substance by means of a braking through the
10 brake system of the vehicle is possible on the basis of whether the relative distance (d_r) and a relative velocity (D_r) between the vehicle and the forward substance give a predetermined relationship when the relative positional relationship determining section
15 determines that the brake control inhibit flag F_{CA} is set to the logical " 1 " and the relative distance (d_r) is equal to or smaller than the brake control operation distance (d_{SET}).

20 17. A vehicular traveling control apparatus as claimed in claim 16, further comprising a second collision avoidance enabling determining section that determines whether a collision avoidance against the forward substance by means of a vehicular driver's
25 steering operation is possible on the basis of a vehicular lateral movement (Y) required for avoiding the collision against the forward substance and a time (T_y) required for the vehicle to avoid the collision by means of the vehicular driver's steering
30 operation from the vehicular lateral movement when the relative positional relationship determining section determines that the brake control inhibit flag (F_{CA}) is reset to the logical " 0 " and the

relative distance (d_r) is equal to or smaller than the brake control operation distance (d_{SET}).

18. A vehicular traveling control apparatus as
5 claimed in claim 17, wherein the lateral movement (Y) is determined on the basis of one of magnitudes of a rightward movement required to steer the vehicle in a rightward direction to avoid the collision against the forward substance and a leftward movement
10 required to steer the vehicle in a leftward direction to avoid the collision against the forward substance which is smaller than the other and a time it takes to steer the vehicle to avoid the collision against the forward substance by the lateral movement (Y).

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19. A vehicular traveling control apparatus, comprising:

vehicular forward substance detecting means for detecting a forward substance located in a
20 forward direction of the vehicle:

vehicular travel controlling means for performing a vehicular travel control on the basis of a relative positional relationship between the forward substance detected by the vehicular forward
25 substance detecting means and the vehicle;

impulse detecting means for detecting such an impulse that a detection range of the vehicular forward substance detecting means is varied has been applied to the vehicular forward detecting section;
30 and

traveling control inhibiting means for inhibiting the vehicular traveling control by means of the vehicular travel controlling means when the

impulse detecting section detects that the impulse has been applied to the vehicular forward substance detecting means.

5 20. A vehicular traveling control method, comprising:

providing a vehicular forward substance detecting section that detects a forward substance located in a forward direction of the vehicle:

10 performing a vehicular travel control on the basis of a relative positional relationship between the forward substance detected by the vehicular forward substance detecting section and the vehicle;

detecting such an impulse that a detection
15 range of the vehicular forward substance detecting section is varied has been applied to the vehicular forward detecting section; and

inhibiting the vehicular traveling control when detecting that the impulse has been applied to
20 the vehicular forward substance detecting section.

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